Study of Healthcare Technology Services
<table>
<thead>
<tr>
<th>Chapter</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthcare Industry</td>
<td>5-20</td>
</tr>
<tr>
<td>Healthcare IT Industry</td>
<td>21-35</td>
</tr>
<tr>
<td>Healthcare IT Segments</td>
<td>36-44</td>
</tr>
<tr>
<td>Healthcare Outsourcing Industry</td>
<td>45-50</td>
</tr>
<tr>
<td>Offshoring to India</td>
<td>51-55</td>
</tr>
<tr>
<td>Deal Activity</td>
<td>55-61</td>
</tr>
<tr>
<td>Conclusion</td>
<td>62-63</td>
</tr>
<tr>
<td>Appendix</td>
<td>64-77</td>
</tr>
</tbody>
</table>
In this report the Healthcare Industry from a global perspective is covered, in terms of the players and the growth drivers. Next the US Healthcare Industry is covered with respect to the major regulatory changes, the reasons for the same, the details and implications of these changes and how they affect the healthcare IT/BPO segments. The payer as well as the provider landscape in the US and the trends for the same are also touched upon.

Next the Healthcare IT market has been covered in terms of the market size, the growth rates as well as the sub-segments. After that the growth drivers for this segment especially in the analytics related offerings have been identified and explained. This is followed by a sub segment wise coverage in terms of the offerings, the key players as well as the trends in the segment.

In the next section the key drivers for outsourcing of healthcare IT services is covered in terms of the factors driving the payers and providers to opt for outsourcing followed by the offshoring potential to India.

The report then concludes with significant deal activity in the space and concluding remarks.

Some of the sources used for the study include-

» Centre for Medicare and Medicaid Services
» American Health Association
» US Congressional Budget Office
» Office of the National Coordinator for Health Information Technology
» World Bank
» United Nations
» WHO
» World Economic Forum
» Hamleton Partners
» American Well
» Company News/ Reports

» Bloomberg Intelligence
» JP Morgan Reports
» Levitt Partner Reports
» Oliver Wyman Reports
» Accenture Research
» IBM
» IDC
» Gartner
» Markets and Markets
» Berkery Noyes
### Executive Summary

1. **Global Healthcare Costs on the rise**
   - With chronic diseases on the rise, increasing life expectancy and proportion of aged population, healthcare costs globally are expected to increase
   - This increase is likely to result in an increase in healthcare IT spending by healthcare payers and providers

2. **US Healthcare undergoing reform driven transformation**
   - With the highest healthcare costs in the world, the US healthcare industry reached an inflection point in 2009, driven by the financial crisis
   - Wave of healthcare reforms have transformed and continue to transform the US healthcare Industry

3. **Adoption of Healthcare IT on the rise**
   - Due to various regulatory requirements under the series of healthcare reforms, the adoption of IT by healthcare players is on the rise
   - The healthcare IT/BPO industry is at USD 111.9 Billion in 2015 and is expected to grow at a CAGR of 11.9% to reach USD 196.1 Billion by 2020

4. **Movement towards Healthcare Analytics**
   - Various requirement under the Affordable Care Act such as the requirement to reduce re-admissions, the need to conduct community health assessment and the requirement to be able to exchange electronic data is resulting in the adoption of Big Data and Analytics
   - Population Health Management solutions, FWA reduction solutions and Health Information Exchange platforms are key analytics solutions offered

5. **Push for offshoring**
   - With consolidation expected in both payer and provider markets and the increased need to cut down on operating costs, outsourcing of healthcare services is on the rise

6. **Outsourcing to India**
   - Healthcare offshoring to India has been relatively modest due to privacy concerns and lack of familiarity with US Healthcare regulations
   - However, due to the development of local healthcare infrastructure and health insurance markets, the Indian offshoring of healthcare services is predicted to grow at a CAGR of 9.6% from 2015 to 2020

7. **Deal Activity**
   - Deal activity in Healthcare IT space saw an all time high both in terms of value and volume with a shift towards strategic acquisitions as compared to financial ones
   - The drivers for deal activity in the domain include the consolidation occurring in the healthcare industry, the need to expand offerings and the saturation of certain market segments
Section 1: Global Healthcare Industry
Regulators involve government departments in most countries, since a high proportion of healthcare spending is by governments across the countries. Consultants and academia provide expert knowledge in the healthcare domain.
Intricate chart illustrating the drivers of increased healthcare costs, including:


- **Healthcare Costs (Years)**:

**Proportion of Population Over 50 is Increasing Rapidly**

- **2015**:
  - 0-19: 22.3, 20-49: 43.6, 50+: 34.1

- **2030**:
  - 0-19: 22.3, 20-49: 43.6, 50+: 34.1

**Proportion (%) of Worldwide Healthcare Spending**

- **Developed Economies**: 90% in 1995, 79% in 2012, 67% in 2022.
- **Emerging Economies**: 10% in 1995, 21% in 2012, 33% in 2022.

**Chronic Illness Cases**

- **Cancer**: 126.2, 2015, 87.3, 2030.
- **Diabetes**: 24.6, 2015, 15.6, 2030.
- **Alzheimer’s**: 6.9, 2015, 4.3, 2030.
- **Asthma**: 6.1, 2015, 2.4, 2030.
- **Epilepsy**: 2.0, 2015, 1.2, 2030.

**Source**: World Bank, United Nations, WHO, WEF.
Section 2: US Healthcare Reforms
Trends in the US Healthcare Industry

Drivers for Healthcare Reform

» Being the highest healthcare spender in the world, US’ spending almost doubled per capita as compared to other industrialized economies; pressure on the government to cut down on costs was immense; Increasing uninsured rate and the Financial Crisis of 2008 were major triggers
» Wave of reforms motivated by the need to curtail costs, improve quality of care across the care continuum and improve penetration of coverage

Impact on Healthcare IT Industry

» Wave of reforms changing the way IT is used by payer and providers for financing and delivering healthcare. This is causing healthcare companies to adopt newer healthcare solutions as well as for the creation of new segments in this industry
» Increased requirement for cost as well as quality management is forcing the healthcare payers and providers to adopt technology for streamlining their operations and better managing patient care
» With increased data availability, the use of analytics for understanding the health conditions of the population and accordingly focusing healthcare delivery towards reducing costs is gaining traction. Payer side analytics for reducing FWA is also coming up
Factors Leading to Healthcare Reforms in US

US HAS ONE OF THE HIGHEST PER CAPITA SPENDING ON HEALTHCARE AND THE HIGHEST OVERALL

$3.031 Trillion

Key Notes

» In spite of not having universal healthcare coverage, the United States of America has the highest healthcare costs in the world at over 3 trillion dollars.

» These costs are expected to increase further, both in absolute terms and on a per capita basis.

» The higher spending has not resulted in better healthcare quality with US ranking last among 11 industrialized countries surveyed by The Commonwealth Fund.

CONTINUOUS INCREASE IN PER CAPITA HEALTHCARE COSTS LEADING UP TO 2009 (USD)


STEADY INCREASE IN UNINSURED POPULATION ACCELERATED BY RECESSION OF 2008
Wave of Healthcare Reforms - HITECH Act, 2009

THE HEALTH INFORMATION TECHNOLOGY FOR ECONOMIC AND CLINICAL HEALTH (HITECH) ACT, 2009

Adoption and Meaningful use of EHR

**Stage 1**
- Electronically capturing patient information and sharing it with them
- Using the information to track performance and for reporting

**Stage 2**
- Detailed information sharing with patients and with HIEs
- Higher requirement for electronic prescribing; incorporation with lab results

**Stage 3**
- Patient access to self management tools for chronic illnesses
- Support for population health management tools

**Impact**
- Spike in adoption of EHR among hospitals, physician practices
- EHR vendor market reaching maturity with focus shifting towards software replacement
- Movement towards stage 3 is laying focus on use of analytics

Incentives for eligible hospitals and professionals if they adopt EHR by 2015 for Medicare and by 2016 for Medicaid. Fines on Medicare from 2015 for not demonstrating meaningful use

**UNIQUE REGISTRATIONS FOR EHR INCENTIVES PEAKING OUT**

**CUMULATIVE EHR INCENTIVE PAYMENTS ALSO SATURATING**

Source: CMS

Private & Confidential
## Wave of Healthcare Reforms - ACA, 2010

**The Patient Protection and Affordable Care Act, 2010**

### Provisions

<table>
<thead>
<tr>
<th>Government</th>
<th>Provider</th>
<th>Private Payers</th>
<th>Employer/ Individual</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>State Based Health Exchanges</strong>&lt;br&gt;Regulated, online marketplaces from where individuals and small businesses can compare and purchase health plans.</td>
<td><strong>Medicare Reform</strong>&lt;br&gt;Restructuring of the reimbursements moving from fee for service to bundled payments.</td>
<td><strong>Guaranteed Issue</strong>&lt;br&gt;Insurers prohibited from denying coverage to individuals due to pre-existing conditions, gender, geographical location etc.</td>
<td><strong>Employer Mandate</strong>&lt;br&gt;There will be a penalty for employers, employing 50 or more workers and not offering health insurance.</td>
</tr>
<tr>
<td><strong>Subsidized Coverage</strong>&lt;br&gt;Low income individuals and their families will receive federal subsidies if the insurance is availed from the exchange. Coverage to include up to 133% of the poverty line.</td>
<td><strong>MSSP</strong>&lt;br&gt;Eligible providers can set up Accountable Care Organizations and rewards are given to them for lowering health care costs while meeting performance standards.</td>
<td><strong>Premium Curbs</strong>&lt;br&gt;If an insurer wants to increase the premium on a policy by 10 per cent or more, federal approval of the same is necessary. The payers also have to negotiate their prices with a state insurance commissioner.</td>
<td><strong>Individual Mandate</strong>&lt;br&gt;All individuals not covered by an employer sponsored health plan/public insurance programs need to secure an approved private-insurance policy or pay a penalty.</td>
</tr>
<tr>
<td><strong>Commercialization of Health plans resulting in payers taking a hit on their bottom lines, forcing providers to shift towards value based payment models.</strong></td>
<td><strong>Onus shifting to the providers to manage the overall health of their population necessitating the use more complicated and integrated technology platforms.</strong></td>
<td><strong>With improved accountability of providers, payers are segmenting the providers based on their performance in order to cut down on costs.</strong></td>
<td><strong>Employers are shifting from a reactive to a pro-active strategy in managing the health of employees and new technology tools are coming up for implementing this.</strong></td>
</tr>
</tbody>
</table>

Source: CMS
As a result of the Affordable Care act, the number of accountable care organizations has increased.

Primarily set up to bring affordability to the federally funded Medicare program, it is now being taken up by states for disbursement of Medicaid and by commercial payers as well.

This is necessitating the need for better IT solutions for providers in order to keep track of their population and to manage costs better.
The 10th revision of the International Classification of Disease, a medical classification list by WHO increases the number of medical codes from 14000 to 70000. This will have an impact on the billing systems adopted by providers, the EHR modules as well as the claim management softwares of payers, resulting in an increased IT spend. In FY 17, 1,900 diagnosis codes and 3,651 hospital inpatient procedure codes will be added to ICD-10. This will further give a boost to the healthcare spending.

The act replaces the Sustainable Growth Rate Model of Medicare payment with an incentive based system model. Introduces Merit Based Incentive Payment System (MIPS) where the increment in Medicare payment is tied to the performance of the provider under various performance metrics. Encouragement is given for taking up alternative payment models based on quality of performance of providers in terms of patient health. This act is expected to give a further impetus to quality driven payment models thus acting as a driver for the Healthcare IT industry.
Section 2: US Healthcare Provider-Payer Landscape
Health Insurance for Americans aged 65 and above who have worked and paid into the system

Financed by 2.9% payroll tax from employers and workers

Medicaid is a healthcare program for individuals with income up to 133% of the poverty line

Significant expansion to the Medicaid program was done as a part of the ACA

Children’s Health Insurance Program, Military Health System, Veteran Health Administration, Indian Health Service, Federal Employees Health Benefits Platform

MANAGED CARE ORGANIZATION BASED HEALTHCARE PAYMENT MODEL

Payer driven network for financing/delivery of healthcare services by coordinating between patients, providers, employers & govt schemes

Reduced inefficiencies due to better care coordination

ACCOUNTABLE CARE ORGANIZATION BASED MODEL

Medicare ACO

Pioneer ACOs as well as MSSP ACOs come under this

Medicaid ACO

Implemented at state levels and vary between states

Commercial ACO

Similar to public ACO model but by payers/employers

Shared Savings

Medicare

Medicaid

Employer

Private Payer

Individual
US Healthcare Provider Landscape

Major portion of the provider landscape in the US is privately owned

100%: 5627

- Community Hospitals: 87.5%
- Non Federal Psychiatric Care: 18.7%
- Federal Government Hospitals: 7.2%
- Others: 3.8%

Breakup of Community Hospitals

- Non Government Not-For-Profit: 60.98%
- For-Profit Community Hospitals: 17.8%
- State/Local Government Community Hospitals: 51.0%

Key Notes

- Major proportion of US hospitals (87.5%) are owned by private parties or by local governments; high proportion of this (60.98%) is owned by private companies.
- Being the major cost center for the healthcare system, with increased healthcare costs, provider systems are coming under pressure to reduce costs.
- The number of hospitals in the US has been falling for the past few years and is likely to continue in the future.
- Major reasons attributed to this include the increased healthcare costs, availability of telemedicine, and availability of quality metrics of hospitals to patients.

Number of hospitals and beds declining due to shift from inpatient to outpatient

Source: AMA, CMS
US Healthcare Provider Landscape

Declining Inpatient Utilization

» Over time inpatient admissions have been on the decline due to the following reasons
  » Technological advancements in surgery procedures causing a shift towards outpatient surgeries
  » Increased cost differential between inpatient-outpatient surgeries

Impact of Reforms

» With the healthcare reforms, the number of insured has increased driving up patient volumes
» However, the shift to value based care and the opening of health insurance exchanges is causing them to shift towards ambulatory services

Consolidation in Inpatient Facilities

» Due to reduced inpatient volumes consolidation of inpatient facilities is expected in order to breakeven on the high fixed costs associated with inpatient facilities

Expansion of Healthcare Systems

» At the same time, in order to capture the shift of patients to ambulatory practices, larger healthcare systems are coming up centered around academic medical centers
» Such arrangements are beneficial to both parties with ambulatory practices benefitting from tie-ups with established practices

SHIFT FROM INPATIENT TO OUTPATIENT TREATMENT CONTINUES WITH REDUCED INPATIENT ADMISSIONS AS WELL AS UTILIZATION

- Total Admissions in US Registered Hospitals
- Bed Utilization
Most of the US health insurance landscape is dominated by employer schemes routed through commercial payer organizations along with Medicare and Medicaid schemes of the government. The proportion of these payments routed through accountable care organizations has increased with time to about 32% of Medicare payments and 16.7% of Medicaid payments in 2015. Following the increase in Medicare and Medicaid ACOs, the commercial payers are also shifting towards ACO based payment models, with this segment expected to see the highest growth rate among the three segments.

Source: JP Morgan, Levitt Partners
US Healthcare Payer: Consolidation Expected

**Key Notes**

» The increased insurance coverage under the ACA due to the employer and individual mandates, has resulted in an increase in payer top lines

» The bottom lines have taken a hit as a result of regulatory requirement to reduce restrictions on premiums being charged

» Consolidation is expected in the market due to
  » Need to achieve economies of scale to improve profit margins
  » Need to broaden width of offerings to include Medicare, Medicaid and public exchanges
  » Need to improve bargain power with providers in an increasingly competitive market

---

1: Revenue and Profit Margin Numbers are for top 6 insurers by market share
2: Deal Sizes are tentative numbers given by Bloomberg; deals yet to be executed
Section 3: The Healthcare IT Industry
Healthcare IT Industry Segments

HCIT Industry

- Hospitals
  - Inpatient EHR
  - Computerized Patient Order Entry
  - Emergency Department Information System
  - Revenue Cycle Management
  - HIE/Integration Engine
  - Support Functions
- Physicians
  - Ambulatory EHR
  - Practice Management
  - Patient Engagement
- Payer
  - Product Development
  - Claims Management
  - Provider Network Management
  - Member Management
  - Fraud Management
- Other Services
  - Pharmacies/Laboratories
  - TeleHealth

Support Functions
Customer Relations Management
Population Health

Areas where high growth is expected

Product/Service
Product/Service/BPO
KPO
Healthcare IT Industry: Market Size and Growth

HEALTHCARE IT INDUSTRY TO DOUBLE IN NEXT 5 YEARS (USD BILLION)

CAGR: 11.9%

2015: 111.9 Billion
2020: 196.1 Billion

OUT OF THIS PROVIDERS IT/BPO WAS AT USD 61.8 BILLION DOLLARS AND PAYERS OUTSOURCE USD 39.6 BILLION

LABORATORY/PHARMACY & OTHERS CONTRIBUTES USD 8.3 BILLION

TELEHEALTH IS A SEGMENT THAT IS EXPECTED TO GROW AT A FAST PACE AND REACH USD 6.5 BILLION BY 2020

Key Notes

» The total spend on IT/BPO by healthcare providers. Payers, Laboratories, Pharmacies and by the government is estimated at USD 111.9 Billion in 2015 and is expected to reach 183.9 Billion in 2020

» Out of this providers IT/BPO was at USD 61.8 Billion Dollars and Payers outsource USD 39.6 Billion

» Laboratory Pharmacy and Medical Image Analysis platforms contribute USD 8.3 Billion

» Telehealth is a segment that is expected to grow at a fast pace and reach USD 6.5 Billion by 2020

Source: MarketsandMarkets, Frost & Sullivan

PROVIDER BREAKUP

PAYER BREAKUP

IN-HOUSE VS OUTSOURCED SERVICES FOR PAYERS/ PROVIDERS

PRIVATE & CONFIDENTIAL

AVENDUS
Healthcare IT Industry: Market Size and Growth

**Key Notes**

» In the provider segment, the EHR and RCM form almost 50% of the IT share. However, these markets are facing full penetration and the focus is shifting towards patient engagement and population health management.

» In the payer market financial claims processing forms the major part of the industry followed by member management as well as provider network management.

» Analytics based platforms including population health management and health information exchange engines are also gaining traction with the demand for them coming from the regulatory changes.

Source: MarketsandMarkets, Frost&Sullivan, EY Estimates
HISTORIC HEALTHCARE IT/BPO REVENUE OF 40 COMPANIES (USD MILLION)

CAGR: 14.5%

2012 2013 2014 2015
29.0 31.6 38.3 43.5

HISTORIC AND EXPECTED REVENUE OF MAJOR LISTED PLAYERS (USD MILLION)

CAGR: 12.7%

2012 2013 2014 2015 2016 2017
5,838.0 6,330.5 7,173.9 8,447.5 9,584.4 10,613.9

CAGR: 12.1%

Key Notes

» The top 40 healthcare IT companies have grown at a high CAGR of 14.5% over the past 4 years. The growth can be attributed to the increased consumption of EHRs by healthcare systems as well as other sub segments of the hospital information systems. On the payer side the growth was driven by solutions for claims processing and member management.

» Over the next 2 years, the listed players are expected to grow at a CAGR of 12.1%, according to analyst estimates which is slightly lower than the growth in the previous period

» The growth drivers going forward are likely to be analytics based tools such as population health management, patient engagement solutions and payment integrity solutions
Section 4: Drivers for adoption of Healthcare IT
Healthcare IT Drivers

1. Increase in Healthcare Costs
   - The per capita healthcare costs have increased continuously in the US resulting in it becoming unaffordable for many
   - Cost Cutting by adopting IT has become imperative for healthcare payers and providers

2. Meaningful Use Requirements
   - In order to avail incentives under the Meaningful use of Electronic Health Records and to avoid penalties, digitization of electronic health records is being taken up by providers
   - This adoption is driving the Electronic Health records market towards saturation

3. Rapid Capex RoI
   - IT offerings such as Revenue Cycle Management are offering rapid impacts on the bottom line with respect to the initial investments
   - Hospitals are finding adoption of such technology initiatives to be an attractive option

4. Need to Engage with Patients
   - As a result of the Affordable Care Act, providers are now responsible for looking after the health of the population they manage
   - For this providers are engaging with patients electronically to help them better manage their health

5. Cloud Based Implementation
   - The use of cloud based platforms is increasing with Software and Platforms being available as a service
   - Given the low initial investment requirement for these services, ambulatory practices are also beginning to adopt information technology for running their clinics
Section 4: Drivers for adoption of Healthcare Analytics
Factors Driving the Growth of Healthcare Analytics

HEALTHCARE ANALYTICS A FAST GROWING SEGMENT ($ BILLION)

CAGR: 26.4%

1. Increase in Data availability
   » Globally, the adoption of technology by providers has resulted in an increase in patient medical data availability
   » In the US, due to the adoption of the HITECH Act of 2009, the adoption of EMR/EHR has increased rapidly and the market is reaching maturity

2. Increase in FWA
   » Increased levels of fraud, waste and abuse in both state sponsored medical schemes as well as private insurance schemes has led to an increased impetus to adopt strategies for reducing FWA
   » Focus is shifting from traditional pay and chase strategy to a preventive strategy based on predictive analytics

3. Impact of ACA: Risk Shifting
   » The Patient Protection and Affordable Care Act of 2010, has laid the ground work for risk shifting in the payer provider landscape that has required the HIT industry to provide new and more integrated solutions
   » This act has also resulted in a lot of startups being established in the Health Tech space

4. Interoperability Requirement
   » With the EHR adoption almost reaching saturation, the focus is shifting towards being able to share medical records, based on different vendor platforms, between providers
   » Along with state sponsored health exchanges, agreements between vendors/providers are coming up for this purpose

NORTH AMERICA FORMS A MAJOR PORTION OF THIS REVENUE ($ BILLION)

CAGR: 26.0%
Increased Medical Data Availability Causing Increased adoption of Analytics

HOSPITAL DATA AVAILABILITY (PETABYTES)

- CAGR: 63.1%
- 2012: 500 petabytes
- 2020: 25000 petabytes

PRIMARY RESEARCH INDICATES ROUTINE USE OF EHR ON THE RISE

- Communicate electronically with patients: CAGR: 32.1%
- Electron Notification of patients’ interactions with other HO’s: CAGR: 19.0%
- Use Computerized DSS: CAGR: 12.3%
- Electronic referrals to/from other HOs: CAGR: 10.3%
- Other Parameters: CAGR: 3.6%

Key Notes

- There is a strategic shift by physicians from judgment based decision making to evidence based decision making which is driving the need for aggregating data from different sources.
- The HITECH Act of 2009 that set apart $25.9 billion to promote and expand the adoption of health information technology has provided impetus for adoption of EMRs by healthcare providers.
- According to primary research, the adoption of electronic records as well as their use according to the meaningful use criteria as defined in the HITECH act has increased from 2012 to 2015 in the US.

Note: 1: The parameters used here are a part of the Meaningful Use of EHR defined by CMS for Medicare/Medicaid incentives
Source: IBM, Accenture Doctors Survey 2015, US
High EHR penetration increasing availability of structured patient data

NON FEDERAL US HOSPITALS ADOPTING EHR SATURATING

SOME SCOPE LEFT IN AMBULATORY EHR

Key Notes

» EHR incentives are a part of the HITECH act. Incentives for Medicare end in 2016 and for Medicaid in 2021 and penalties for not adopting EHR have started from 2015 and are to increase in steps till 2017
» There is some space for growth in ambulatory EHR software market but with the saturation of inpatient EHR the focus is shifting towards replacement of EHR software
» Increased availability of data has laid the foundation for adoption of analytics by both payers and providers in areas such as population health management, prevention of fraud in claims processing etc.

Source: CMS, ONC, AHA
According to IBM the US Healthcare Industry loses about $180 billion annually due to Fraud, Waste and Abuse

97% of the Healthcare Payers are expected to invest in solutions focused on reducing FWA in 2014-15, an increase by 100% over the previous year

Development of the “Analytics as a service” market is driving growth in this sector with even the larger payers receiving some complementary analytics services over the cloud apart from the in-house FWA capabilities

Source: IDC, US Government Data
Provider Payment for Medicare/ Medicaid shifting from FFS to Value Based Reimbursement

- **ACOs share upside risk in case of savings, but no downside risk**
- **ACOs share upside and downside risk**
- **Better incentive for providers to cut down on costs, but clarity on historic benchmarks is absent and hence, inefficient providers may still be rewarded for slight improvements to efficiency**
- **Risk of occurrence of illness remains on payer but risk of severity and cost of treatment shifts to providers**
- **Fixed payments made to ACOs and onus of maintaining health of the population and managing costs is on the provider**

### Key Notes

- With increase in levels of value based reimbursements and with the onus on the providers to improve overall health of the patients in the long run, they too are starting to employ analytics, to better understand their patients population
- Higher integration between payers and providers is being seen in analytics solutions for population health

Source: CMS, US Congressional Office

### Chart Details

- **Risk Shifting**
  - **2016**
    - Bundled/Global: 30%
    - One/Two Sided: 55%
    - FFS Payment: 15%
  - **2018**
    - Bundled/Global: 50%
    - One/Two Sided: 40%
    - FFS Payment: 10%

- **NUMBER OF ACOs INCREASING**
  - 2013: 134
  - 2014: 368
  - 2015: 426
  - **CAGR: 13.2%**

- **Medicare ACOs**
- **Non CMS ACOs**
Interoperability the New Buzz Word

“Interoperability is the ability of two or more healthcare entities to exchange and incorporate information with pre-coordination and context such that the information has utility in improving patient care”

PERCENTAGE OF NON FEDERAL US HOSPITALS ELECTRONICALLY EXCHANGING LAB RESULTS WITH OUTSIDE PROVIDERS

PERCENTAGE OF PHYSICIANS WHO SHARED PATIENT HEALTH DATA WITH OTHER PROVIDERS

MODELS FOR EHR / EMR INTEROPERABILITY

Health Information Exchanges (HIE)
Transfer of records through a publically funded or state government health information exchange

Direct Message Exchanges
Part of the meaningful use of EHR requirements in which providers can exchange EMR/EHR data directly

Private HIEs
Due to the high costs and inflexibility of public HIEs large private providers are making their own HIEs both for their own organization and for other providers

EMR Vendor HIEs
HIEs hosted by vendors and servicing providers, mainly their own clients

P2P Interfaces
Typical connections that are designed for sharing of pre-specified data elements, provided by vendors, but at a high cost

SUPPORTED BY:

Government
Private Provider
Vendor

1: Source KLAS Survey for Interoperability, 2015
ADOPTION OF CLOUD BASED EHR INCREASING

<table>
<thead>
<tr>
<th>Percentage of Providers</th>
<th>2012</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10 Physicians</td>
<td>39%</td>
<td>46%</td>
</tr>
<tr>
<td>10-24 Physicians</td>
<td>24%</td>
<td>27%</td>
</tr>
<tr>
<td>25+ Physicians</td>
<td>20%</td>
<td>26%</td>
</tr>
</tbody>
</table>

Cloud Based Systems

» With need to comply with regulatory requirements, smaller practices are adopting cloud based services as compared to on-premises solutions
» Rapid RoI and low initial investments are leading to a shift towards such platforms
» Healthcare analytics offerings over the cloud (analytics-as-a-service) are also becoming attractive with several vendors offering such products

NEW TECHNOLOGIES COMING UP

Natural Language Processing

» Natural language processing (NLP) can extract medical concepts from free text and augment the discrete, coded clinical patient findings that are already in the EHR, such as vital signs and lab results.
» With the help of this the quantum of data that will become available in a structured format will increase greatly and lead to even wider application of analytics in Healthcare

Genomics

» Genomics data can be used in diagnosis of patients suffering from chronic ailments like diabetes, cancer etc.
» It can also be used for screening patients for risk of disease and defining cohorts of patients for population health management
» Personal genomics is an emerging field in which individuals can have access to their genetic data and this is the category driving this segment

Source: Gartner, MEDScape
Section 5: Segments of the Healthcare IT Industry
### Healthcare IT Industry Segments (1/7)

<table>
<thead>
<tr>
<th>Offerings</th>
<th>Computerized Patient Order Entry</th>
<th>Emergency Department Information System (EDIS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>» Administrative clinical data maintenance for patients over time&lt;br&gt;» Automation of access to medical history&lt;br&gt;» Sharing of medical data between departments and with other provider institutions</td>
<td>» This software is used for managing the process of patient onboarding and scheduling of appointments as well as providing support for waiting lists and capacity management&lt;br&gt;» It offers optimization of workflow and optimum capacity utilization</td>
<td>» Emergency Department (ED) Triage that prioritizes &amp; schedules patient emergency treatment and streamlines workflow&lt;br&gt;» ED documentation solutions that ensure appropriate coding and documentation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key Players</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>» Cerner, McKesson, Epic, CPSI, Allscripts, Heathland, MediTech, MedHost&lt;br&gt;» Consolidated segment: 93% of the market dominated by 8 vendors¹</td>
<td>» Dominated by a few players, such as Cerner, McKesson, Epic, Allscripts, athenaHealth, MediTech, MedHost, CPSI</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comments</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>» Major portion of provider IT market&lt;br&gt;» US market reaching maturation as a result of HITECH act of 2009&lt;br&gt;» Focus shifting towards replacement and upgradation of existing EHR systems</td>
<td>» This system is the platform over which all other IT systems for providers can be built&lt;br&gt;» Integration with the revenue cycle management systems is driving the growth in this segment</td>
</tr>
</tbody>
</table>

Source: KLAS 2014 Market Share Report, News and Reports
### Healthcare IT Industry Segments (2/7)

<table>
<thead>
<tr>
<th>Offerings</th>
<th>Key Players</th>
<th>Comments</th>
</tr>
</thead>
</table>
| **Ambulatory EHR** | » Administrative clinical data management for physician practices  
» Automation of patient data access and sharing with other practices  
» Integration with practice and revenue management | » Cerner, eClinicalWorks, Allscripts, athenaHealth, Practice Fusion, Quality Systems, Greenway, GE Healthcare, Cerner, McKesson etc. | » Fragmented market with top 10 players having 50% market share in 2014  
» With physician adoption of EHR close to reaching maturation, this segment is likely to consolidate, with some M&A deals happening in this space already |
| **Practice Management** | » Aimed at increasing office efficiency by creating electronic appointments, patient flow management systems  
» Integrates the transaction, claims and denial management with the patient management | » Cerner, McKesson, Epic, Allscripts, GE Healthcare, athenaHealth, MediTech, eClinicalWorks | » The segment is categorized into three segments- on premises, web based and cloud based  
» Due to smaller size of the physician practices, most of them prefer web based solutions and this category has the largest market share |
| **Revenue Cycle Management** | » RCM includes three stages:  
» Pre-intervention (Registration, eligibility verification, data entry)  
» Intervention (Retrieval/ Interpretation of EHR, Physician Notes) and  
» Post-intervention services (Coding, claims management) | » Product companies include Cerner, McKesson, Epic, Allscripts, GE Healthcare etc.  
» BPOs offering RCM services are Genpact, Cognizant, Wipro, Infosys etc. | » Compliance requirements to the ACA and ICD-10 guidelines has brought focus to this segment  
» Consolidation of the industry is expected with the larger players acquiring the niche ones in order to ensure continuity in offerings |

Source: KLAS 2014 Market Share Report, News and Reports
HIE/ Integration Engine

- HIEs and Integration engines offer interoperability between providers and between providers and other players in the care continuum.
- These services are offered by public HIEs, providers, vendors, and pure play integration engines.

Key Players

- Niche players dominate this segment.
- Some prominent players are Truven Health, Welltok, Healthways, Redbrick Health etc.

Offerings

- Patient portal that facilitates engagement between the provider and the patient.
- Guidance to patients with chronic illnesses for improving quality of life and reducing readmission rates for patients.

Comments

- With increasing healthcare costs, both payers and providers are realizing the need to shift from a reactive to a proactive approach for patient care. Which is driving the growth of this segment.
- Social Media based patient engagement strategies are also coming up.

- With regulatory requirement for interoperability, several EHR vendors are coming up with interchange platforms.
- Alliances between vendors and providers for adopting uniform EHR practices are also coming up. For e.g. CommonWell Alliance.
### Healthcare IT Industry Segments (4/7)

#### Offerings

**Product Development**
- Product development and Business (PDBA)
- Assists in development of health plans specific to clients needs, helps in acquiring new clients through channel management and assistance in insurance underwriting

**Claims Management**
- Electronic handling of claim made by providers, employers and individuals based on coding rules
- Support for manual as well as electronic claims as well as integration with fraud detection module

**Provider Network Management**
- This includes credentialing, contract and records management and claims disbursement
- Using data mining techniques payers can see the performance of various providers and accordingly stratify the risk associated with each of them

#### Key Players

**Product Development**
- Major BPO firms here include Accenture, Cognizant, Capgemini, WNS etc.

**Claims Management**
- Major players include McKesson, Optum Inc, Aldera, Inc., Ayasdi, Inc.
- BPO firms in this segment include firms include Genpact, Infosys, Mphasis etc.

**Provider Network Management**
- Major players include McKesson, Aldera, Inc., Ayasdi, TriZetto Inc.
- Major BPO players in this segment include Cognizant, Accenture, WNS etc.

#### Comments

**Product Development**
- With different regulations coming in as well as the commercialization of health plans, innovation in this field has become essential
- Payers are investing in software as well as outsourced services for this activity

**Claims Management**
- With analytics coming up in fraud detection, integration of these modules with claims management softwares is driving changes in this segment
- Hence a large number of payers are investing in better claims management systems

**Provider Network Management**
- With the shift to value based payments, this segment has shifted from a clerical function to a strategic tool
- Identification of high performing providers and focusing efforts towards managing them is the key focus in the modern system
Healthcare IT Industry Segments (5/7)

**Offerings**

- **Member Management**
  - Involves enrollment of new members in health insurance plans and handling member complaints
  - Involves managing endorsements of insurance policies so that the insured party receives increased coverage

- **Fraud Management**
  - Use of analytics to go through the claims data to identify fraudulent claims
  - Automated identification of possible fraud through pre-defined patterns

**Key Players**

- **Member Management**
  - Major players include McKesson, Aldera, Inc., Ayasdi, TriZetto Inc., Change Healthcare etc.
  - Major BPO players in this segment include Genpact, HCL, WNS etc.

- **Fraud Management**
  - Major players include IBM, Verisk Health, Truven Analytics, SAS Institute, Oracle Corporation, Cerner, Xerox etc.

**Comments**

- **Member Management**
  - A surge in the number of insurance seekers is driving this segment
  - Payers are looking to invest in member management systems that can increase their customer base and at the same time increase turnaround time

- **Fraud Management**
  - Focus is shifting from traditional pay and chase strategy to preventive techniques
  - These are based on predictive analytics that identify patterns of fraud occurrence and flag potential fraudulent claims before the payment disbursement stage
**Population Health**

» Population Health Management includes stratifying population groups based on risk, identifying high cost conditions and taking action

» Analytics is used to study historical data in order to stratify populations and give insights

**Customer Relation Management**

» CRM services can be for both payers and providers; It can be in the form of call centers for addressing grievances of the customers

» CRM softwares include referral development as well as individual customer acquisition

**Support Functions**

» Support functions include Finance and accounting, HR services, sales as well as supply chain services as well as data and content management

**Offerings**

» IBM Watson, Cerner, eClinicalWorks, Allscripts, athenaHealth, Practice Fusion, Quality Systems, Greenway, GE Healthcare, Cerner, McKesson etc.

» CRM BPO companies include

» CRM software vendors include Healthgrades, MarketWare systems, Oracle, tuOtempo

**Key Players**

» Major BPO firms provide this outsourcing service

**Comments**

» With the shift from Fee for Service to value based reimbursement, the onus on managing healthcare costs is shifting from payers to providers

» This has resulted in vendors expanding their solutions to include providers into the loop

» CRM solutions are increasingly being used to acquire new customers with an increase in the competition

» With digitization of health data, higher speed of communication and engagement with the patient are expected

» With both payers and providers trying to cut down on costs improving efficiency in spending in the support functions is a key driver for investing here

» Regulatory requirements becoming more stringent is another driver for investing in this sub-segment
# Healthcare IT Industry Segments (7/7)

## Offerings

<table>
<thead>
<tr>
<th>Pharmacies</th>
<th>TeleHealth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Billing facilities in pharmacies along with the management of claims with payers</td>
<td>Remote delivery of medical assistance using digital platforms in order to support provider network</td>
</tr>
<tr>
<td>Solutions also include vendor specific suites that can aid interchange of information between the pharmacies and payers as well as providers</td>
<td>Delivery can be in the form of two-way video, smart phones, wireless tools and other forms of telecommunications technology</td>
</tr>
</tbody>
</table>

## Key Players

<table>
<thead>
<tr>
<th>Pharmacies</th>
<th>TeleHealth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change Healthcare (EMDEON), Truven, UnitedHealth, MediData, Veeva are the major players in this segment</td>
<td>Niche players dominate this segment including Teladoc, American Well, Doctor on Demand, MD Live</td>
</tr>
</tbody>
</table>

## Comments

<table>
<thead>
<tr>
<th>Pharmacies</th>
<th>TeleHealth</th>
</tr>
</thead>
<tbody>
<tr>
<td>The solutions are also now being extended to providers to access the drug databases created by vendors. For e.g. Cerner Multum</td>
<td>According to a survey about 63% of consumers prefer videoconferencing as the preferred mode of telemedicine, with 30% preferring audio</td>
</tr>
<tr>
<td>Interlink age between providers, payers and pharmacies as well as exchanges is driving growth in this segment</td>
<td>With worldwide connectivity increasing this field has the potential to bring quality medical access to remote areas</td>
</tr>
</tbody>
</table>

Source: American Well
### PROVIDER SOLUTIONS: CASE STUDIES

#### IBM Watson predictive analytics for Pinnacle Health Systems

<table>
<thead>
<tr>
<th>Need</th>
<th>Solution</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>» Requirement to adhere to regulatory requirement of re-admission rates of chronically ill patients</td>
<td>» IBM identified certain clinical parameters that can be used to predict re-admission rates</td>
<td>» Software was able to predict re-admission cases with 85% accuracy</td>
</tr>
<tr>
<td>» Aspiration for better customer service experience</td>
<td>» Predictive Analytics used to combine past record data with live patient info to predict re-admission cases navigation</td>
<td>» Insights into the behavior of patients help them in finding long term solutions for the patient’s illness</td>
</tr>
</tbody>
</table>

**Aegis.net’s role in provider EHR Interoperability**

<table>
<thead>
<tr>
<th>Need</th>
<th>Solution</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>» Interoperability is challenging due to inherent incompatibility of EHRs provided by different vendors</td>
<td>» Aegis works with developers in order to reduce the optionality implicit in interoperability standards</td>
<td>» Providers and vendors can reliably exchange EHR data with other providers that have tested against Aegis' published profiles</td>
</tr>
<tr>
<td>» Developers of integration engines facing challenges due to the ambiguities in the standards</td>
<td>» Aegis provides a cloud-based interoperability testing harness and continuous conformance platform</td>
<td>» Aids in iterative design and development of interchange engines</td>
</tr>
</tbody>
</table>

### PAYER SOLUTIONS: CASE STUDIES

#### Jiff, an Enterprise Health Benefits Platform

<table>
<thead>
<tr>
<th>Need</th>
<th>Solution</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>» Nearly 50% of US’ health insurance is covered by employers</td>
<td>» Mobile application that tracks the employee activity</td>
<td>» Volume and size of employee claims reduce as they adopt a healthier lifestyle</td>
</tr>
<tr>
<td>» Health insurance coverage costs are increasing</td>
<td>» Rewards given to employee for adopting a healthier lifestyle</td>
<td>» Better optimization of workforce as they tend to fall ill less often and chronic illnesses also reduce</td>
</tr>
<tr>
<td>» Poor lifestyle of employees further putting strain on health insurance costs</td>
<td>» Analytics used to study employee behavior and customize employer health plans accordingly</td>
<td></td>
</tr>
</tbody>
</table>

**IBM solutions for faster records access for Molina Healthcare**

<table>
<thead>
<tr>
<th>Need</th>
<th>Solution</th>
<th>Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>» Molina’s (a managed care company) reimbursement from CMS for state health schemes is based on its HEDIS rank</td>
<td>» Centralization of all medical records and integration of case management of charts into the company’s HEDIS and risk assessment infrastructure</td>
<td>» Molina is able to access medical records faster and compile its HEDIS ranking comprehensively and in a shorter time frame</td>
</tr>
<tr>
<td>» Large volumes of complex medical data needs to be compiled within a strict deadline to get the payments</td>
<td>» Better reimbursement rate for from CMS due to a better HEDIS ranking</td>
<td></td>
</tr>
</tbody>
</table>

Source: News & Articles
Section 7: Drivers for Healthcare IT/BPO Outsourcing
Drivers for Healthcare Outsourcing

**PAYER SIDE DRIVERS**

- **Uptick in Enrollment for Insurance**
  » As the number of insurance seekers increases as a result of the ACA, the need for member management and claims management outsourcing is increasing

- **Pressure on Premium Margins**
  » With regulatory mandates, restrictions on the premium that can be charged have increased. Hence, payers are outsourcing non-core business functions

- **Increased Outsourcing of Data Analytics**
  » With the growth in the global analytics market driven by the BFSI sector, healthcare payers are also starting to outsource their PHM and FWA avoidance solutions

- **Assistance in PDBA**
  » With the increased complexity of payer-provider networks, new health plans as well as business segments are coming up, necessitating the need for outsourcing in PDBA

**PROVIDER SIDE DRIVERS**

- **Hospital Margins Declining with shift to Value Based Payment**
  » The per capita reimbursement received by hospitals is falling as a result of which, they are forced to cut down on costs, driving outsourcing of non-core functions

- **Consolidation in the Market**
  » The consolidation in provider market is resulting in larger hospital systems as a result of which the outsourcing done by them is also increasing

- **Outsourcing to Battle Inefficiencies**
  » Given the high percentage of inefficiencies in the provider market, outsourcing of RCM and Medical billing in order to reduce errors is increasing

- **ICD 10 adherence requirements**
  » The need to adhere to the more complex coding system of ICD 10, is forcing hospital chains to outsource this function to BPOs
PERCENTAGE OF THE US POPULATION INSURED HAS SHOWN A MARKED INCREASE

- As a result of the employer and individual mandates in ACA, the enrollment for health plans has seen a considerable increase.
- With an increased insured populace, the volume as well as variety of plan offerings has gone up.
- This is resulting in the outsourcing of claims management as well as member management processes by the payers in order to cut down costs and reduce errors the same time.

CAGR INCREASE IN HEALTHCARE PREMIUM HAS DECLINED AFTER THE ENACTMENT OF ACA

- As a result of the PPACA, curbs have been placed on the increases in premium by healthcare payers.
  - Any increase in premium on a plan over 10% needs federal approval.
  - Prices and change in prices of plans need to be approved by state health plan exchanges.
- As a result there is pressure on margins of payers forcing them to move towards outsourcing.

Driver for Healthcare Outsourcing in the Payer Market

**GLOBAL ANALYTICS OUTSOURCING MARKET SHOWING A STEEP INCREASE (USD BILLION)**

<table>
<thead>
<tr>
<th>Year</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value (USD billion)</td>
<td>0.88</td>
<td>1.14</td>
<td>1.48</td>
<td>1.93</td>
<td>2.53</td>
<td>3.33</td>
</tr>
</tbody>
</table>

CAGR: 30.5%

**Increased Outsourcing of Data Analytics**

- The global analytics outsourcing market is increasing at a rapid rate of 30.5%.
- There is an increase in the use of analytics for risk stratification of the insured population in the form of population health management as well as the use of analytics for reducing Fraud, Waste and Abuse.
- Outsourcing of these services to KPOs is also increasing with an increase in KPOs focused on healthcare coming up.

**Assistance in PDBA**

- With the increase in regulatory requirements and the changing payer-provider landscape payers need to come up with newer health plans and also need to manage networks of more complex natures.
- This is causing significant spend by Healthcare Payers towards outsourcing Product Development and Business Acquisition services.

Source: Technavio
As the industry shifts towards value-based payments, the per patient revenue that is available to hospitals both from government schemes as well as from commercial payers is declining. As a result, hospitals are outsourcing the non-core aspects of their business in order to achieve their cost targets and spend the funds available with them judiciously.

**Consolidation in the Market**

- In the past five years, there has been a spike in the M&A transactions in the hospital sector.
- This indicates a consolidation happening in the field with hospital systems coming together in order to cut down on costs by achieving economies of scale.
- As a result of this, the outsourcing requirements of the segment are also increasing as hospital systems become more complex and difficult to manage.
The 10th revision of the International Classification of Disease, a medical classification list by WHO increases the number of medical codes from 14,000 to 70,000. In order to be compliant with the ICD 10 standards, healthcare providers are outsourcing their medical coding and billing, which is more complicated as compared to the previous coding standard.

Outsourcing to Battle Inefficiencies

- Traditionally, the healthcare system has been inefficient in terms of administrative costs as well as inefficient delivery of care.
- By outsourcing some of the administrative and practice management aspects that aren’t core aspects of the hospital business, hospitals can cut down on costs.
- Revenue Cycle Management and Medical Billing are some of the services being outsourced in this segment.

INEFFICIENCIES IN ADMINISTRATION AND DELIVERY IS HIGH IN THE HEALTHCARE SYSTEM (USD BILLION)

Unnecessary Services: 210
Excessive Administration Costs: 190
Inefficient Delivery of Services: 130
High Prices: 105
Fraud: 75
Missed Prevention: 55

Total: $320 Billion

INCREASED TECH SPEND REQUIREMENT FOR ADHERENCE TO ICD 10 REQUIREMENTS (USD '000s)

Small Practices: 60
Medium Practices: 200
Large Practices: 2000

Source: US Institute of Medicine, AMA
Section 8: Offshoring to India
Growth in Healthcare Industry in India driving IT Growth

**INDIAN HEALTHCARE IT/BPO PROJECTED TO GROW FAST (USD BILLION)**

- 2014: 1.1
- 2015: 1.2
- 2020: 1.9

CAGR: 9.5%

**Development of Domestic Healthcare**

- Local Healthcare infrastructure is developing fast with the increased healthcare demand by the burgeoning middle class
- This brings familiarity to the Healthcare procedures thereby driving outsourcing

**Penetration of Domestic Insurance**

- With the aid of government schemes and an increase in disposable income, the penetration of insurance in India is increasing
- This brings familiarity to the payer side of operations and boosts the outsourcing market

**Well established outsourcing Practice**

- India being one of the leading global IT outsourcing/BPO destinations in India, has the required infrastructure and scalability to achieve economies of scale
- The well educated as well as English speaking population makes India an ideal outsourcing destination

**Cost Savings**

- As compared to outsourcing within one of the developed world countries, offshoring to India, provides a high degree of cost savings
- Given the fact that providers and payers are facing increasing cost pressure, offshoring becomes an attractive option

**DISTRIBUTION OF OUTSOURCED SERVICES TO INDIA (USD MILLION)**

- Software: 96.8, 9%
- Payer Outsourcing: 800.0, 77%
- Provider Outsourcing: 150.0, 14%

Source: Nasscom, Frost & Sullivan
**Growth in Healthcare Industry in India driving IT Growth**

**Indian Healthcare Infrastructure Growing at a Fast Pace ($ Billion)**

- **CAGR:** 16.5%

**Insurance Coverage Also Increasing at Steady Pace ($ Billion)**

- **CAGR:** 23.0%

**Key Notes**

- With an increasing demand for better healthcare by the burgeoning middle class along with the increased FDI inflows into the healthcare sector resulting in the setting up of top-notch healthcare facilities, healthcare uptake in India has grown exponentially.
- With schemes such as the Rashtriya Swasthya Bima Yojana the penetration off health insurance in India, especially among the poorer sections is increasing.
- As a result of the growth in the hospital infrastructure and the penetration of insurance the healthcare IT industry is also growing fast and is expected to reach $1.9 Billion by 2020.

Source: IRDA, Frost & Sullivan
Easily Available Talent Pool at Lower Costs Contributing to the Growth

**EMPLOYABILITY PERCENTAGE FOR INDIAN GRADUATES**

<table>
<thead>
<tr>
<th>Service</th>
<th>FY 2014</th>
<th>FY 2015E</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT Services</td>
<td>13.0</td>
<td>21.4</td>
</tr>
<tr>
<td>IT Operations</td>
<td>15.7</td>
<td>15.9</td>
</tr>
<tr>
<td>Sales &amp; Business Development</td>
<td>14.2</td>
<td></td>
</tr>
<tr>
<td>Operations/ Customer Service</td>
<td>35.9</td>
<td>3.0</td>
</tr>
<tr>
<td>Clerical/Secretarial</td>
<td></td>
<td>2.2</td>
</tr>
</tbody>
</table>

**ENTRY LEVEL SALARY INDICES**

<table>
<thead>
<tr>
<th>City</th>
<th>IT Services</th>
<th>ITes and BPO</th>
<th>IT Operations</th>
<th>Sales &amp; Business Development</th>
<th>Operations/ Customer Service</th>
<th>Clerical/ Secretarial</th>
</tr>
</thead>
<tbody>
<tr>
<td>San Antonio, TX</td>
<td>11x</td>
<td>8x</td>
<td>5x</td>
<td>4x</td>
<td>4x</td>
<td>3x</td>
</tr>
<tr>
<td>Sao Paulo</td>
<td>6x</td>
<td>4x</td>
<td>4x</td>
<td>2.3x</td>
<td>1.4x</td>
<td>1.3x</td>
</tr>
<tr>
<td>Mexico</td>
<td>3x</td>
<td>1.4x</td>
<td>1.4x</td>
<td>1.2x</td>
<td>1x</td>
<td>1x</td>
</tr>
<tr>
<td>Cape Town</td>
<td>1.4x</td>
<td>1.4x</td>
<td>1.3x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beijing</td>
<td>1x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manila</td>
<td>1x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bengaluru</td>
<td>1x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**EMPLOYEE BASE – IT/BPM (’000)**

<table>
<thead>
<tr>
<th>FY 2014</th>
<th>FY 2015E</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT Services</td>
<td>3,290</td>
</tr>
<tr>
<td>ITes and BPO</td>
<td>129 USD BN</td>
</tr>
</tbody>
</table>

**INDIAN IT/BPM MARKET**

- **CAGR ~13%**
- **129 USD BN**
- **146 USD BN**

**Key Notes**

- ~1.5 Mn Industry ready professionals enter Indian market every year making it world’s largest base for employable graduates with 36% share in the world.
- There is growing demand for functional expertise; Employee structure shifting from pyramid to hourglass structure with more emphasis on domain work experience – 11% domain specialists are employed.
- Moderate inflation coupled with innovative & automated processes led to revenue growth 50% higher than employee growth in last 5 years.

*Source: Nasscom Reports, National Employability Reports*
Threats to Offshoring to India

1. Privacy Issues
   - Given the sensitive nature of the medical data healthcare payers and providers are hesitant in offshoring such data to remote locations like India as they are uncertain about the data privacy laws of the region.
   - According to a survey by Black Book, only 10% of payer IT executives were willing to offshore their business process.

2. Lack of Policy Information
   - Indian BPO firms lack an understanding of the complex nature of the Healthcare landscape in the US market. Understanding of the international medical laws and regulatory requirements is also low.
   - Gradual turnaround is happening with BPO firms trying to gain expertise in this space in order to capture this market.

3. Competition from Near Shoring
   - Payers and providers tend to prefer near shore BPO firms as compared to those in offshore locations like India due to privacy concerns as well as better domain expertise.
   - Tradeoff between reduced costs and better expertise eventually determines the near shoring vs offshoring preference.

4. Increasing Manpower Costs
   - The increasing costs in India is resulting in competition from other emerging economies that are able to provide outsourcing services at a reduced rate.
   - In Tholon’s list of top 100 outsourcing destination as overtaken Mumbai for the second spot and Cebu City has overtaken Pune for the 7th spot.
Section 9: Deal Activity
MAJORITY OF ACQUIRED IT/BPO FIRMS ARE NORTH AMERICAN HEADQUARTERED

Drivers for M&A Activity

- **Market Consolidation**: As the Health care payer and provider markets consolidate and the market for traditional offerings like EHR and RCM saturate, consolidation is occurring.
- **Portfolio Expansion**: With the shift to value based care Healthcare firms are also expecting a wider range of offerings from the vendors, thereby causing the larger HIT players to acquire firms with niche offerings.
- **Client Acquisition**: Analytics firms as well as those associated with big data are acquiring competitors in order to gain access to a wider data set as well as to bring in economies of scale to justify their capex.
- **Market Entry**: Players with offerings in selective areas like exclusive caterers of provider services wanting to cater to the payer side or IT/BPO firms wanting to enter Healthcare IT domain are acquiring niche players.

TOTAL DISCLOSED DEAL VALUE INCREASING (USD MILLION)

- **FY 13**: 4,574.9
- **FY 14**: 5,020.7
- **FY 15**: 7,301.4
- **CAGR**: 26.3%

PERCENTAGE SHARE OF STRATEGIC DEALS HAS INCREASED

- **2014**: 64%
- **2015**: 75%

- **Strategic**: 36%
- **Financial**: 25%

Source: Hambleton, Berkery Noyes
# Deal Activity

<table>
<thead>
<tr>
<th>Date</th>
<th>Target</th>
<th>Description</th>
<th>Acquirer</th>
<th>Deal Type</th>
<th>Deal Value (USD Mn)</th>
<th>EV (USD Mn)</th>
<th>EV/EBITDA</th>
<th>EV/REVENUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>05/16</td>
<td>Multi-Plan Inc.</td>
<td>US-based provider of network based healthcare cost management solutions</td>
<td>Hellman &amp; Freidman LLC, Leonard Green &amp; Partners LP, GIC Private Limited</td>
<td>PE</td>
<td>7,500.0</td>
<td>7,500.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>04/16</td>
<td>Verisk Analytics</td>
<td>US-based company engaged in providing risk assessment services and decision analytics insurance, healthcare, government, and human resources fields</td>
<td>Veritas Capital</td>
<td>PE</td>
<td>820.0</td>
<td>820.0</td>
<td>9.1</td>
<td>2.6</td>
</tr>
<tr>
<td>05/16</td>
<td>IMS Health</td>
<td>Provides information, services and technology for the healthcare industry</td>
<td>Quintiles Transnational Holdings Inc.</td>
<td>M&amp;A</td>
<td>12,912.0</td>
<td>12,912.0</td>
<td>18.3</td>
<td>4.4</td>
</tr>
<tr>
<td>04/16</td>
<td>NAPA</td>
<td>US based provider of practice management solutions</td>
<td>American Securities LLC, Leonard Green and Partners Inc.</td>
<td>PE</td>
<td>850.0</td>
<td>850.0</td>
<td>6.25</td>
<td></td>
</tr>
<tr>
<td>04/16</td>
<td>Quorum Health</td>
<td>US-based provider of management services to not-for-profit US hospitals</td>
<td>Community Health Systems</td>
<td>M&amp;A</td>
<td>384.0</td>
<td>384.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03/16</td>
<td>Alliance Healthcare</td>
<td>US-based company engaged in providing outpatient diagnostic imaging and radiation therapy services</td>
<td>Fujian Thai Hot Investment Co Ltd.</td>
<td>PE</td>
<td>642.1</td>
<td>738.5</td>
<td>7.1</td>
<td>1.6</td>
</tr>
<tr>
<td>03/16</td>
<td>Netsmart Technologies Inc.</td>
<td>US-based company engaged in developing and providing data management software and technology solutions</td>
<td>Allscripts Healthcare Solutions</td>
<td>M&amp;A</td>
<td>950.0</td>
<td>950.0</td>
<td>13.6</td>
<td></td>
</tr>
<tr>
<td>03/16</td>
<td>Connecture Inc.</td>
<td>US-based company providing Web-based sales, service, and process automation solutions to health insurance industry</td>
<td>Francisco Partners, L.P., Chrysalis Ventures</td>
<td>PE</td>
<td></td>
<td></td>
<td>52.0</td>
<td></td>
</tr>
<tr>
<td>03/16</td>
<td>HIMS Consulting</td>
<td>US-based company engaged in providing healthcare technology services</td>
<td>HCTec Partners</td>
<td>M&amp;A</td>
<td>28.0</td>
<td>28.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>02/16</td>
<td>Adaptive Software LLC</td>
<td>US-based company engaged in providing business process management software solutions for the pharmacy industry</td>
<td>Decision Resources Group</td>
<td>M&amp;A</td>
<td>24.5</td>
<td>24.5</td>
<td>7.7</td>
<td></td>
</tr>
</tbody>
</table>
## Deal Activity

<table>
<thead>
<tr>
<th>Date</th>
<th>Target</th>
<th>Description</th>
<th>Acquirer</th>
<th>Deal Type</th>
<th>Deal Value (USD Mn)</th>
<th>EV (USD Mn)</th>
<th>EV/EBITDA</th>
<th>EV/REVENUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/16</td>
<td>Truven Health Analytics</td>
<td>US-based company that offers information, analytic tools, benchmarks, and services to the healthcare sector</td>
<td>IBM Watson Health</td>
<td>M&amp;A</td>
<td>2,600.0</td>
<td>2,600.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>02/16</td>
<td>HealthPlan Holdings Inc</td>
<td>US-based provider of employee benefits plan services to insurance companies, HMOs, unions, associations etc.</td>
<td>Wipro Limited</td>
<td>M&amp;A</td>
<td>460.0</td>
<td>460.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/16</td>
<td>Aglius Healthcare</td>
<td>US-based company which develops and implements Oracle-based business intelligence solutions for healthcare providers</td>
<td>Sentry Data Systems Inc.</td>
<td>M&amp;A</td>
<td>7.0</td>
<td>7.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/16</td>
<td>Healthline Networks Inc.</td>
<td>US-based company that provides health and wellness information to consumers through its website</td>
<td>Summit Partners LLP</td>
<td>PE</td>
<td>95.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01/16</td>
<td>McKinnis Consulting Services, LLC</td>
<td>US-based provider of revenue cycle assessment, strategy and optimization assistance for healthcare providers</td>
<td>Navigant Consulting Inc.</td>
<td>M&amp;A</td>
<td>52.0</td>
<td>52.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/15</td>
<td>Altrusia Health Inc</td>
<td>US-based provider of care management technology solutions for Medicaid, long-term care etc.</td>
<td>CHSO Management, LLC</td>
<td>PE</td>
<td>63.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/15</td>
<td>Equian LLC</td>
<td>US-based company engaged in providing healthcare reimbursement analysis and payment integrity solutions</td>
<td>New Mountain Partners IV, L.P.</td>
<td>PE</td>
<td>225.0</td>
<td>225.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12/15</td>
<td>MDRx Enterprise Inc.</td>
<td>US-based company providing healthcare practice management and billing services</td>
<td>Constellation Healthcare Technologies, Inc.</td>
<td>M&amp;A</td>
<td>30.0</td>
<td>30.0</td>
<td>8.8</td>
<td>1</td>
</tr>
<tr>
<td>12/15</td>
<td>Accretive Health Inc.</td>
<td>US-based company engaged in providing healthcare RCM services to hospitals and healthcare providers</td>
<td>TowerBrook Capital Partners L.P., Ascension Health Ventures, LLC</td>
<td>PE</td>
<td>200.0</td>
<td>316.8</td>
<td></td>
<td>1.5</td>
</tr>
<tr>
<td>11/15</td>
<td>Healthland Inc.</td>
<td>US-based company engaged in the provision of healthcare IT solutions to rural community and critical access hospitals</td>
<td>Computer Programs and Systems, Inc.</td>
<td>M&amp;A</td>
<td>250.0</td>
<td>297.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Deal Activity

<table>
<thead>
<tr>
<th>Date</th>
<th>Target</th>
<th>Description</th>
<th>Acquirer</th>
<th>Deal Type</th>
<th>Deal Value (USD Mn)</th>
<th>EV (USD Mn)</th>
<th>EV/EBITDA</th>
<th>EV/REVENUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/15</td>
<td>MedAssets Inc.</td>
<td>US-based healthcare analytics company providing cost and clinical resource management and data and analytics tools</td>
<td>Pamplona Capital Management LLP</td>
<td>PE</td>
<td>2,638.5</td>
<td>2,638.5</td>
<td>17.3</td>
<td>3.7</td>
</tr>
<tr>
<td>10/15</td>
<td>HealthFusion Holdings, Inc.</td>
<td>US-based developer of web-based, cloud computing software for physicians, hospitals, and medical billing services</td>
<td>Quality Systems, Inc</td>
<td>M&amp;A</td>
<td>190.0</td>
<td>190.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/15</td>
<td>Aesmynt Incorporated</td>
<td>US-based company providing integrated solutions to automate the supply and medication-use processes in community and university hospitals, and integrated delivery networks</td>
<td>Omnicell, Inc.</td>
<td>M&amp;A</td>
<td>217.3</td>
<td>217.3</td>
<td>10.9</td>
<td>1.2</td>
</tr>
<tr>
<td>10/15</td>
<td>Xtend Healthcare LLC</td>
<td>US based provider of RCM services including health insurance claims billing and account resolution, patient billing, as well as revenue cycle consulting</td>
<td>Navient Corporation</td>
<td>M&amp;A</td>
<td>160.0</td>
<td>160.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/15</td>
<td>InflowHealth, LLC</td>
<td>US-based company that develops SaaS-based software specializing in improving the operational and financial performance of physician practices</td>
<td>Premier, Inc.</td>
<td>M&amp;A</td>
<td>8.1</td>
<td>8.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>09/15</td>
<td>ECS</td>
<td>US-based company engaged in providing medical record retrieval services and software</td>
<td>Healthport-IOD</td>
<td>M&amp;A</td>
<td>131.0</td>
<td>131.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>09/15</td>
<td>Phoenix Health LLC</td>
<td>US-based based company engaged in (RCM) businesses and a national clearing house that operates in automobile claims processing vertical for healthcare providers</td>
<td>Constellation Healthcare Technologies, Inc.</td>
<td>M&amp;A</td>
<td>10.5</td>
<td>10.5</td>
<td>4.8</td>
<td>1.1</td>
</tr>
<tr>
<td>09/15</td>
<td>NorthStar First Health LLC</td>
<td>US-based provider of Revenue Cycle Management (RCM) services to healthcare providers</td>
<td>Constellation Healthcare Technologies, Inc.</td>
<td>M&amp;A</td>
<td>11.5</td>
<td>11.5</td>
<td>6.1</td>
<td>1.5</td>
</tr>
<tr>
<td>08/15</td>
<td>RSA Medical LLC</td>
<td>US-based outsourced provider of technology-based risk management services</td>
<td>Xerox Corporation</td>
<td>M&amp;A</td>
<td>141.0</td>
<td>141.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Deal Activity

<table>
<thead>
<tr>
<th>Date</th>
<th>Target</th>
<th>Description</th>
<th>Acquirer</th>
<th>Deal Type</th>
<th>Deal Value (USD Mn)</th>
<th>EV (USD Mn)</th>
<th>EV/EBITDA</th>
<th>EV/REVENUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/15</td>
<td>Healthcare Insights, LLC</td>
<td>US-based company engaged in providing financial management software solutions for hospitals and healthcare-related businesses</td>
<td>Premier, Inc.</td>
<td>M&amp;A</td>
<td>65.0</td>
<td>65.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06/15</td>
<td>Merge Healthcare</td>
<td>US-based provider of medical imaging and interoperability solutions</td>
<td>IBM Corporation</td>
<td>M&amp;A</td>
<td>903.9</td>
<td>903.9</td>
<td>21.9</td>
<td>4.3</td>
</tr>
<tr>
<td>04/15</td>
<td>CECity.com, Inc.</td>
<td>US-based company engaged in providing cloud-based healthcare solutions specializing in performance management and improvement, pay-for-value reporting and professional education</td>
<td>Premier, Inc.</td>
<td>M&amp;A</td>
<td>28.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06/15</td>
<td>Altegra Health</td>
<td>US-based company engaged in providing medical and physician coding training, outsourcing and consulting services</td>
<td>Change Healthcare</td>
<td>M&amp;A</td>
<td>910.0</td>
<td>910.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07/15</td>
<td>Health Net</td>
<td>US-based health care service provider through health plans and government-sponsored, managed-care plans</td>
<td>Centene Corporation</td>
<td>M&amp;A</td>
<td>5,925.0</td>
<td>5,925.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>06/15</td>
<td>Nant Health LLC</td>
<td>US-based healthcare cloud-based IT company that develops diagnostics and therapeutics technologies</td>
<td>Allscripts Healthcare Solutions</td>
<td>M&amp;A</td>
<td>200.0</td>
<td>2,000.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>05/15</td>
<td>Sentry Data Systems Inc.</td>
<td>US-based company engaged in providing technology solutions that help healthcare providers to reduce total cost of care, manage compliance and produce better outcomes</td>
<td>ABRY Partners VIII LP</td>
<td>PE</td>
<td>200.0</td>
<td>200.0</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>03/15</td>
<td>Catamaran Corp</td>
<td>US-based provider of pharmacy benefit management services and healthcare information technology solutions to the healthcare benefit management industry</td>
<td>UnitedHealth Group, Inc.</td>
<td>M&amp;A</td>
<td>13,342.8</td>
<td>13,342.8</td>
<td>15.9</td>
<td>0.6</td>
</tr>
</tbody>
</table>

**Average** 11.5 2.6
Conclusion
Concluding Remarks

<table>
<thead>
<tr>
<th>Health Care Reform</th>
<th>Revenue Cycle Management</th>
<th>Population Health Management</th>
<th>Payment Integrity Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>HITECH Act</td>
<td>Impetus towards adoption of IT for patient medical data</td>
<td>EHR vendor market consolidating; Focus shifting towards use of analytics</td>
<td>Vendors expanding their offerings to include analytics solutions</td>
</tr>
<tr>
<td>Patient Protection &amp; Affordable Care Act</td>
<td>Risk shifting from payers towards providers</td>
<td>Onus on hospitals to better manage health of their population</td>
<td>Hospital adoption of tools such as PHM increasing</td>
</tr>
<tr>
<td></td>
<td>Limited budgets for providers to cover treatment costs</td>
<td>Consolidation expected in provider market</td>
<td>Increased outsourcing &amp; adoption of RCM to cut costs</td>
</tr>
<tr>
<td></td>
<td>Premium margins of insurers under pressure</td>
<td>Increasing pressure on payers to plug inefficiencies</td>
<td>Adoption of analytics tools to combat payment inaccuracy</td>
</tr>
</tbody>
</table>

- The reduced reimbursements from the government and commercial payers is driving the growth of this industry
- Outsourcing gaining impetus with consolidation of provider market

2015-20 CAGR:
- Revenue Cycle Management: 11.9%
- Population Health Management: 23.2%
- Payment Integrity Solutions: 12.9%

Source: MarketsandMarkets, Frost&Sullivan

» Pressure on bottom lines of payers due to curbs imposed under ACA, require them to better channel payments
» Use of predictive analytics to combat FWA is expected to increase
Appendix 1: Market Sizing Exercise

**Hospitals**
- Operating IT Expenses
  - Sample Opex for 524 hospitals
  - Regression showing high correlation between opex/capex and number of hospital
  - Extrapolation of opex and capex to total US hospitals-5267
  - Total Opex-USD 879.31 Billion
  - 2.6% of Total Opex (HIMSS)
  - IT Opex-USD 23.74 Billion
  - Extrapolation of opex and capex to total US hospitals-USD 35.85 Billion
  - Total Provider IT spend based on US share (72%)-USD 61.8 Billion

**Physician Practices**
- Capital IT Expenses
  - Sample Capex for 524 hospitals
  - 53% of Total 916,264 physicians
  - USD 9.73 Billion

**Payer Side**
- Global Health Insurance Industry-USD 4.78 Trillion
  - Health Insurance Industry-USD 1.08 Trillion
  - Health Insurance as a percentage of Total Insurance-22.6%
  - Total Insurance IT Spend-USD 174.9 Billion
  - Total Healthcare Payer IT spend-USD 39.60 Billion

**Vendor Based Mapping**
- Healthcare segmental revenue for IT/BPO companies
  - Revenues for 105 listed/unlisted companies (Revenue > USD 50 Million)
  - Healthcare Product/ITO/BPO-USD 65.4 Billion

**Global Health Insurance Industry**
- USD 4.78 Trillion

**Health Insurance Industry**
- USD 1.08 Trillion

**Total Insurance IT Spend**
- USD 174.9 Billion

**Total Healthcare Payer IT spend**
- USD 39.60 Billion
## Appendix 2:
### Major Healthcare Provider Vendor Companies

<table>
<thead>
<tr>
<th>Company</th>
<th>Inpatient EHR</th>
<th>Patient Accounting</th>
<th>EDIS</th>
<th>Ambulatory EHR</th>
<th>Practice Management</th>
<th>RCM</th>
<th>Analytics</th>
<th>Patient Engagement</th>
<th>2015 HIT Revenue ($ Mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerner</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>4425.2</td>
</tr>
<tr>
<td>McKesson</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>3069.0</td>
</tr>
<tr>
<td>CHT</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>1838.3</td>
</tr>
<tr>
<td>Epic</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>1790.2</td>
</tr>
<tr>
<td>Allscripts</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>1386.4</td>
</tr>
<tr>
<td>GE Healthcare</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>1058.3</td>
</tr>
<tr>
<td>AthenaHealth</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>924.7</td>
</tr>
<tr>
<td>MEDITECH</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>475.5</td>
</tr>
<tr>
<td>MEDHOST</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>245.9</td>
</tr>
<tr>
<td>CPSI</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>225.4</td>
</tr>
</tbody>
</table>
Appendix 2:
Healthcare Provider Vendor Niche Companies

Ambulatory EHR
- Greenway Health
- eClinicalWorks
- CareCloud
- Kareo
- aprima
- Quality Systems Inc.
- Quest Diagnostics
- CureMD

Practice Management
- practicefusion
- Nextech
- OFFICELY
- primed

Revenue Cycle Management
- CHANGE Healthcare
- ACCRETIVE HEALTH
- PARALLON BUSINESS SOLUTIONS
- CONIFER HEALTH SOLUTIONS
- TRIZETTO
- TRUVEN Health Analytics
- Availity
- The SSI Group, Inc.
- MedAssets
- navicure
- Experian Health

Patient Engagement
- welltok
- TRUVEN Health Analytics
- HEALTHWAYS
- REDBRICK HEALTH
### Appendix 2:

**Major Healthcare Payer Vendor Companies**

<table>
<thead>
<tr>
<th>Company</th>
<th>Claims Processing</th>
<th>Provider Network Management</th>
<th>Member Management</th>
<th>Analytics</th>
<th>2015 HIT Revenue ($ Million)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OPTUM®</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>6196.0</td>
</tr>
<tr>
<td><strong>MCKESSON</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>3096.0</td>
</tr>
<tr>
<td><strong>CHANGE HEALTHCARE™</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>1525.6</td>
</tr>
<tr>
<td><strong>TriZetto®</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>724.5</td>
</tr>
<tr>
<td><strong>TRUVEN HEALTH ANALYTICS®</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>610.7</td>
</tr>
<tr>
<td><strong>hms</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>474.2</td>
</tr>
<tr>
<td><strong>Inovalon</strong></td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>✓</td>
<td>432.3</td>
</tr>
<tr>
<td><strong>BENEFITFOCUS®</strong></td>
<td>✓</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
<td>185.1</td>
</tr>
<tr>
<td><strong>Availity®</strong></td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>133.0</td>
</tr>
<tr>
<td><strong>wellcentive</strong></td>
<td>×</td>
<td>✓</td>
<td>×</td>
<td>✓</td>
<td>11.86</td>
</tr>
</tbody>
</table>

Private & Confidential
Appendix 2:
Major Healthcare BPO/BPM Companies

<table>
<thead>
<tr>
<th>Company</th>
<th>Provider Solutions</th>
<th>Payer Solutions</th>
<th>Analytics Services</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patient Accounting</td>
<td>RCM</td>
<td>Claims Handling</td>
</tr>
<tr>
<td>accenture</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Cognizant</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>GENPACT</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>EXL</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>xerox</td>
<td>✓</td>
<td>❌</td>
<td>❌</td>
</tr>
<tr>
<td>WNS</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Hexaware Technologies</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>HGS</td>
<td>✓</td>
<td>✓</td>
<td>❌</td>
</tr>
<tr>
<td>firstsource</td>
<td>✓</td>
<td>❌</td>
<td>❌</td>
</tr>
</tbody>
</table>
## Appendix 2:
### Healthcare Analytics Companies

<table>
<thead>
<tr>
<th>Company</th>
<th>Provider Analytics</th>
<th>Payer Analytics</th>
<th>Integration Engine</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPTUM*</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>IBM Watson</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Verisk Analytics*</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Qsi</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SAS</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>CureMD</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Zirmed</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>TRUEN Health Analytics</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Evolent Health</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>XG Health Solutions</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Company</th>
<th>Provider Analytics</th>
<th>Payer Analytics</th>
<th>Integration Engine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valence Health</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Health Catalyst</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Cognizant</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>3M</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Healthagen</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Commonwell Health Alliance</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Mu Sigma</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Benevita Health</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Mede/Analytics*</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Medecision</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
## Appendix 3: Glossary (A-C)

<table>
<thead>
<tr>
<th>Term</th>
<th>Brief Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACA</td>
<td>Affordable Care Act is a United States federal statute signed into law by President Barack Obama on March 23, 2010. The ACA was enacted to increase the quality and affordability of health insurance and cut down on healthcare costs.</td>
</tr>
<tr>
<td>ACO</td>
<td>Accountable Care Organizations (ACOs) are groups of doctors, hospitals, and other health care providers, who come together voluntarily to give coordinated high quality care to their Medicare patients.</td>
</tr>
<tr>
<td>Ambulatory</td>
<td>Ambulatory care or outpatient care is medical care provided on an outpatient basis, including diagnosis, observation, consultation, treatment, intervention, and rehabilitation services.</td>
</tr>
<tr>
<td>Analytics</td>
<td>Analytics is used to describe statistical and mathematical data analysis that clusters, segments, scores and predicts what scenarios are most likely to happen.</td>
</tr>
<tr>
<td>ARRA</td>
<td>The American Recovery and Reinvestment Act of 2009 was a stimulus package enacted by the 111th United States Congress in February 2009 and signed into law on February 17, 2009, by President Barack Obama.</td>
</tr>
<tr>
<td>BFSI</td>
<td>Banking, Financial services and Insurance (BFSI) is an industry term for companies that provide a range of financial products/services. The term usually comprises commercial banks, insurance companies, non-banking financial companies, cooperatives, pensions funds etc.</td>
</tr>
<tr>
<td>BPM</td>
<td>Business process management (BPM) is a discipline that uses various methods to discover, model, analyze, measure, improve, and optimize business processes.</td>
</tr>
<tr>
<td>BPO</td>
<td>Business process outsourcing (BPO) is the delegation of one or more IT-intensive business processes to an external provider that, in turn, owns, administrates and manages the selected processes based on defined and measurable performance metrics.</td>
</tr>
<tr>
<td>CAGR</td>
<td>The compound annual growth rate (CAGR) is the mean annual growth rate of an investment over a specified period of time longer than one year.</td>
</tr>
<tr>
<td>Capex</td>
<td>A capital expenditure (Capex) is money invested by a company to acquire or upgrade fixed, physical, non-consumable assets, such as buildings and equipment or a new business.</td>
</tr>
<tr>
<td>CHIP</td>
<td>Children’s Health Insurance Program is a program administered by the United States Department of Health and Human Services that provides matching funds to states for health insurance to families with children who are too rich to qualify for Medicare.</td>
</tr>
</tbody>
</table>
### Appendix 3: Glossary (C-F)

<table>
<thead>
<tr>
<th>Term</th>
<th>Brief Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claims Processing</td>
<td>The fulfillment by an insurer of its obligation to receive, investigate and act on a claim filed by an insured. It involves multiple administrative and customer service layers that includes review, investigation, adjustment, remittance or denial of the claim.</td>
</tr>
<tr>
<td>Cloud Computing</td>
<td>Gartner defines cloud computing as a style of computing in which scalable and elastic IT-enabled capabilities are delivered as a service using Internet technologies.</td>
</tr>
<tr>
<td>CMS</td>
<td>The Centers for Medicare &amp; Medicaid Services (CMS) is a US federal agency that administers the Medicare program and works in partnership with state governments to administer Medicaid, CHIP etc.</td>
</tr>
<tr>
<td>Community Hospital</td>
<td>A community hospital refers to a hospital that is accessible to the general public, and provides a general or specific medical care which is usually short-term, in a cost-effective setting, and focuses on preventing illnesses</td>
</tr>
<tr>
<td>CRM</td>
<td>Customer relationship management (CRM) is a business strategy that optimizes revenue and profitability while promoting customer satisfaction and loyalty.</td>
</tr>
<tr>
<td>EBITDA</td>
<td>Earnings Before Interest, Taxes, Depreciation and Amortization is an indicator of a company's financial performance</td>
</tr>
<tr>
<td>EDIS</td>
<td>Emergency Department Information System prioritizes &amp; schedules patient emergency treatment and streamlines workflow</td>
</tr>
<tr>
<td>EHR</td>
<td>An Electronic Health Record is a digital version of a patient’s paper chart. EHRs are real-time, patient-centered records that make information available instantly and securely to authorized users.</td>
</tr>
<tr>
<td>EMR</td>
<td>An electronic medical record (EMR) is a digital version of the traditional paper-based medical record for an individual. The EMR represents a medical record within a single facility, such as a doctor’s office or a clinic.</td>
</tr>
<tr>
<td>EV</td>
<td>Enterprise Value, or EV for short, is a measure of a company's total value, often used as a more comprehensive alternative to equity market capitalization.</td>
</tr>
<tr>
<td>FFS</td>
<td>Fee-for-service (FFS) is a payment model where services are unbundled and paid for separately. In health care, it gives an incentive for physicians to provide more treatments because payment is dependent on the quantity of care, rather than quality of care.</td>
</tr>
</tbody>
</table>
### Term | Brief Meaning
--- | ---
**FTE** | Full-Time Equivalent is a unit that indicates the workload of an employed person in a way that makes workloads or class loads comparable across various contexts.

**FWA** | Fraud is defined as willfully executing a scheme or artifice to defraud any health care benefit program; Waste is overutilization of services or other practices that result in unnecessary costs; Abuse includes any actions that may, directly or indirectly, result in unnecessary costs, improper payments etc.

**Genomics** | Genomics is a discipline in genetics that applies recombinant DNA, DNA sequencing methods, and bioinformatics to sequence, assemble, and analyze the function and structure of genomes.

**Health Exchanges** | In the United States, health insurance marketplaces, also called health exchanges, are organizations set up to facilitate the purchase of health insurance in each state in accordance with the Patient Protection and Affordable Care Act.

**Healthcare System** | A health system, also sometimes referred to as health care system or healthcare system, is the organization of people, institutions, and resources that deliver health care services to meet the health needs of target populations.

**HEDIS** | The Healthcare Effectiveness Data and Information Set (HEDIS) is a tool used by more than 90% of America’s health plans to measure performance on important dimensions of care and service.

**HIE** | Health Information Exchange is the mobilization of health care information electronically across organizations within a region, community or hospital system. The term HIE may also refer to the organization that facilitates the exchange.

**HIMSS** | The Healthcare Information and Management Systems Society is a not-for-profit organization dedicated to improving healthcare quality, safety, cost-effectiveness, and access, through the best use of information technology and management systems.

**HIT** | Healthcare IT refers to the set of applications used to manage hospital operations and by health insurance companies to manage their functioning.

**HITECH** | The Health Information Technology for Economic and Clinical Health (HITECH) Act, enacted as part of the American Recovery and Reinvestment Act of 2009, was signed into law on February 17, 2009, to promote the adoption and meaningful use of health information technology.

**ICD 10** | ICD-10 is the 10th revision of the International Statistical Classification of Diseases and Related Health Problems (ICD), a medical classification list by the World Health Organization (WHO). It contains codes for diseases, signs and symptoms, abnormal findings, complaints, social circumstances, and external causes of injury or diseases.
## Appendix 3: Glossary (I-M)

<table>
<thead>
<tr>
<th>Term</th>
<th>Brief Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient</td>
<td>Inpatient care is the care of patients whose condition requires admission to a hospital.</td>
</tr>
<tr>
<td>Interoperability</td>
<td>In healthcare, interoperability is the ability of different information technology systems and software applications to communicate, exchange data, and use the information that has been exchanged.</td>
</tr>
<tr>
<td>IT</td>
<td>This is the common term for the entire spectrum of technologies for information processing, including software, hardware, communications technologies and related services. In general, IT does not include embedded technologies that do not generate data for enterprise use.</td>
</tr>
<tr>
<td>IT Infrastructure</td>
<td>IT infrastructure refers to the composite hardware, software, network resources and services required for the existence, operation and management of an enterprise IT environment.</td>
</tr>
<tr>
<td>IT Outsourcing</td>
<td>IT outsourcing (as a part of an outsourcing definition) is the use of external service providers to effectively deliver IT-enabled business process, application service and infrastructure solutions for business outcomes.</td>
</tr>
<tr>
<td>ITES</td>
<td>IT Enabled services (ITES), also called web enabled services or remote services or Tele-working, covers the entire gamut of operations which exploit Information Technology for improving efficiency of an organization.</td>
</tr>
<tr>
<td>MACRA</td>
<td>Medicare Access and CHIP Reauthorization Act of 2015 (MACRA), commonly called the Permanent Doc Fix, establishes a new way to pay doctors who treat Medicare patients, revising the Balanced Budget Act of 1997.</td>
</tr>
<tr>
<td>MCO</td>
<td>Managed Care Organisations in the United States is used to describe a variety of techniques intended to reduce the cost of providing health benefits and improve the quality of care</td>
</tr>
<tr>
<td>Medicaid</td>
<td>Medicaid in the United States is a social health care program for families and individuals with low income and limited resources.</td>
</tr>
<tr>
<td>Medical Billing</td>
<td>Medical billing is the process of submitting and following up on claims with health insurance companies in order to receive payment for services rendered by a healthcare provider</td>
</tr>
<tr>
<td>Medical Coding</td>
<td>Medical coding is the transformation of healthcare diagnosis, procedures, medical services, and equipment into universal medical alphanumeric codes.</td>
</tr>
</tbody>
</table>
# Appendix 3: Glossary (M-P)

<table>
<thead>
<tr>
<th>Term</th>
<th>Brief Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicare</td>
<td>In the United States, Medicare is a national social insurance program, administered by the U.S. federal government since 1966. Medicare provides health insurance for Americans aged 65 and older who have worked and paid into the system.</td>
</tr>
<tr>
<td>MSSP</td>
<td>The Medicare Shared Savings Program was established by the Affordable Care Act. It was enacted to ensure better cooperation among providers to improve the quality of care for Medicare Fee-For-Service (FFS) beneficiaries and reduce unnecessary costs.</td>
</tr>
<tr>
<td>NLP</td>
<td>Natural-language processing technology involves the ability to turn text or audio speech into encoded, structured information, based on an appropriate ontology. The structured data may be used simply to classify a document, or to identify findings, procedures, medications, allergies and participants.</td>
</tr>
<tr>
<td>Opex</td>
<td>An operating expense, operating expenditure, operational expense, operational expenditure or OPEX is an ongoing cost for running a product, business, or system.</td>
</tr>
<tr>
<td>P2P Interfaces</td>
<td>A point-to-point Interface refers to a communications connection that enables direct transfer of data between two nodes or endpoints</td>
</tr>
<tr>
<td>PaaS</td>
<td>A platform as a service (PaaS) offering, usually depicted in all-cloud diagrams between the SaaS layer above it and the IaaS layer below, is a broad collection of application infrastructure services</td>
</tr>
<tr>
<td>Patient Engagement</td>
<td>Patient engagement is used to describe everything from patient portals to social media strategies, from tracking vitals with wearables to patients actively participating in their own health and wellness.</td>
</tr>
<tr>
<td>Payer</td>
<td>Any entity that is authorized to provide health insurance payments which may include commercial health insurance companies, federal and state governments as well as employers</td>
</tr>
<tr>
<td>PDBA</td>
<td>Product Development and Business Acquisition refers to the set of activities done by health insurance companies to come up with new insurance instruments as well as to create new networks of customers</td>
</tr>
<tr>
<td>PHM</td>
<td>Population Health Management is the aggregation of patient data across multiple health IT resources, the analysis of that data into a single, actionable patient record, and the actions through which care providers can improve both clinical and financial outcomes.</td>
</tr>
<tr>
<td>PPACA</td>
<td>The Patient Protection and Affordable Care Act is a United States federal statute signed into law by President Barack Obama on March 23, 2010. The ACA was enacted to increase the quality and affordability of health insurance and cut down on healthcare costs</td>
</tr>
</tbody>
</table>
### Appendix 3: Glossary (P-Z)

<table>
<thead>
<tr>
<th>Term</th>
<th>Brief Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice Management</td>
<td>Practice Management software deals with the day-to-day operations of a medical practice. Such software frequently allows users to capture patient demographics, schedule appointments, maintain lists of insurance payors, perform billing tasks, and generate reports.</td>
</tr>
<tr>
<td>Predictive Analytics</td>
<td>Describes approach to data mining with an emphasis on prediction rather than description and rapid analysis measured in days or hours with an emphasis on ease of use and business relevance.</td>
</tr>
<tr>
<td>Provider</td>
<td>Health care providers in the U.S. encompass individual health care personnel, health care facilities and medical products.</td>
</tr>
<tr>
<td>RCM</td>
<td>Revenue Cycle Management encompasses all administrative and clinical functions that contribute to the capture, management, and collection of patient service revenue.</td>
</tr>
<tr>
<td>SaaS</td>
<td>Software that is owned, delivered and managed remotely by one or more providers. The provider delivers software based on one set of common code and data definitions that is consumed in a one-to-many model by all contracted customers at anytime.</td>
</tr>
<tr>
<td>Shared Savings</td>
<td>A payment arrangement in the health care system in which the provider and payer benefit from cost savings undertaken by the healthcare providers.</td>
</tr>
<tr>
<td>Supply Chain</td>
<td>A supply chain is a system of organizations, people, activities, information, and resources involved in moving a product or service from supplier to customer.</td>
</tr>
<tr>
<td>Telehealth</td>
<td>Telehealth is the delivery of health-related services and information via telecommunications technologies. Telehealth could carry from a simple telephone conversation to doing robotic surgery between facilities at different ends of the globe.</td>
</tr>
<tr>
<td>Value Based Payment</td>
<td>Value-Based Payment (VBP) is a strategy used by purchasers to promote quality and value of health care services. The goal of any VBP program is to shift from pure volume-based payment.</td>
</tr>
<tr>
<td>Vendor</td>
<td>A software vendor is an organization specializing in making or selling software, designed for mass or niche markets. This is in contrast to software developed for in-house use only within an organization or software designed or adapted for a single, specific customer.</td>
</tr>
<tr>
<td>WHO</td>
<td>The World Health Organization is a specialized agency of the United Nations that is concerned with international public health.</td>
</tr>
</tbody>
</table>
Thank You!